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12-22-58

PROTOPOPOV, Aleksey Fedorovich; YEPISOV, B.P., professor, retsenzent, kandidat pedagogicheskikh nauk; SKATKIN, M.N., retsenzent, kandidat pedagogicheskikh nauk; BULATOV, N.P., kandidat pedagogicheskikh nauk, retsenzent; BLINCHEVSKIY, F.L., inzhener metodist, retsenzent; MOROZOVA, G.F., redaktor; VASIL'YEV, L.V, redaktor; SAUR, L.S., redaktor; OSTRIROV, N.S. tekhnicheskiy redaktor

[Pedagogical method in trade schools] Pedagogicheskii protsess v remeslennykh uchilishchakh. Moskva, Vses. uchebno-pedagog izd-vo Trudrezervizdat, 1955. 206 p. (MLRA 8:10)

1. Chlen-korrespondent APN-RSFSR (for Yepisov & Skatkin)
(Technical education)

PROTOPOPOV, A.K.

USSR

✓ 5509. ELECTRICAL CONDUCTIVITY OF UNSTEADY FLAME AT REDUCED PRESSURE. Rossikhin, V.S., Protopopov, A.K., Turbyvnik, L.A. and Tsikora, I.L. (Nauch. Zap. Dnepropetrovsk. Gos. Univ., Sborn. Fiz.-mat. Fak. (Sci. Notes Dnepropetrovsk. Gos. Univ., Sborn. fiz.-mat. Fak. (Sci. Notes Dnepropetrovsk Dnepropetrovsk. Gos. Univ., Sborn. fiz.-mat. Fak. (Sci. Notes Dnepropetrovsk Univ., Bull. phys. math. Fac.), 1953, vol. 41, 9-12; abstr. in Ref. Zh. Khim. (Ref. J. Chem., Moscow), 1954, (17), 39282). Experiments in 1948 had shown that conductivity of flames in acetylene/air mixtures depends mainly on conductivity of the inner cone. Experiments are now recorded with a moving flame in a cylinder of 15 cm diameter and 20 cm length with two longitudinal condenser plates of 0.0075 micro F capacity charged to 100 V. The charge remaining in the condenser after it had been discharged to V_0 on the passage of the flame was measured with a ballistic galvanometer,

importance of chemical reaction in the process of ionization.

AUTHOR: Protopopov, A.I. SOV/19-58-6-2/685

TITLE: A Method and Device for Dividing Minerals by Lump Size and Specific Weight (Sposob i ustroystvo razdeleniya mineralov po krupnosti i udel'nomu vesu)

PERIODICAL: Byulleten' izobreteniy, 1958, Nr 6, p 5 (USSR)

ABSTRACT: Class 1a, 30. Nr 113620 (575838/190 of 31 March 1956). Dependent from Author's Certificate Nr 80831. Submitted to the Ministry of Coal Industry of USSR. A method of sorting minerals (as specified in Author's Certificate Nr 80831) by trapping lumps of mineral between rotating surfaces placed at an angle which changes in the process of rotation. Separation is under the effect of friction forces on lumps of coal and rock. Secondly, a device in the form of two opposing gripping surfaces forming changing two-edge angles, one surface in a single piece and the other composed of several sectors mobile in respect to each other and to the single-piece surface.

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PROTOPOPOV, A.K.

1000

Electric conductivity of a nonstationary flame at lowered pressures. S. Ressikhin, A. K. Protopopov, L. A. [illegible] L. Sykora. [illegible] Dnepropetrovsk. Uchenye Zapiski Fiz.-Mat. Fakul'teta 41, [illegible] (1948).—The expts. with a moving flame were made in a cylindrical vessel 250 mm. long and 15 mm. in diam. provided with 2 longitudinal condensers of 0.0070 microfarad capacitance charged up to V_0 = 100 v. The amt. of electricity remaining in the condenser after a passing flame discharged it to a potential of V_1 was detd. with a ballistic galvanometer. The time which the flame spent between the 2 electrodes was detd. from $V_1 = V_0 \exp(-t/RC)$. The min. t corresponds to approx. 12% C_6H_6. The max. current I was between 10 and 12% C_6H_6. The change in I and the no. of charged particles n with pressure p (up 380 mm. Hg) is expressed by $I = \alpha p^2$ which indicates the bimol. nature of the ionization process. This and the noncorrespondence of changes in I with the compn. and temp. of the flame indicates the important role that chem. reaction plays in the ionization process. Through *Referat. Zhur., Khim.*, 1954, No. 39272.

M. Hosen

YARZHEMSKIY, Ya.Ya.; MELKOVA, N.V.; PROTOPOPOV, A.L.; BLAZKO, L.P.

Formation of gliding surfaces in some halogen rocks. Dokl. AN SSSR 148 no.5:1184-1185 F '63. (MIRA 16:3)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut galurgii, Leningrad. Predstavleno akademikom N.M.Strakhovym.
(Haloidite)

PROTOPOPOV, A.N.

str: 4E3d/4E3c

19 19

The γ-rays which accompany the fission of uranium-235 by 2.8- and 14.7-m.e.v. neutrons. A. N. Protopopov and B. M. Shiryaev. *Zhur. Eksptl. i Teorét. Fiz.* 34, 831-3(1958).—A study was made of the γ-rays which are emitted during the fission of U^{235} by fast, 2.8- and 14.7-m.e.v., and thermal neutrons. The spectrum of the γ-quanta was detd. by scintillation counters. On the basis of the exptl. data it was concluded that within the limits of exptl. error (15%), the total energy of the γ-quanta which are emitted during the fission with fast neutrons is the same as that of the γ-quanta emitted during the fission with thermal neutrons.

I. Boytar-Leach

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RMS

PRECEDING PAGE

AUTHORS: [illegible] 8-8-17/35

TITLE: 14,5 MeV Neutron Fission Cross-Sections of Th^{232} and Np^{237} (Secheniya delyatsiya Th^{232} i Np^{237} na bystrykh neytronakh s energiyey 14,5 MeV).

PERIODICAL: Atomnaya Energiya, 1958, Vol.4, Nr 1, pp. 100-101 (USSR)

ABSTRACT: The following fission cross-sections were measured with 14,5 MeV neutrons originating from the T(d,n) He^4 reaction with E_d = 175 KeV:

Th^{232} : σ_f = 0,35 ± 0,02 barn

Np^{237} : σ_f = 2,4 ± 0,2 barn

These results coincide with those obtained by Wilson and Harvey (ref. 1). The authors express their thanks to L. V. Smirtsev and S. A. Il'inskiy for their collaboration. There are 2 figures and 4 references, 1 of which is Slavic.

SUBMITTED: August 31, 1957

AVAILABLE: Library of Congress

Card 1/1

1. Thorium 232 fission-Measurement 2. Neptunium 237 fission-Measurement

PROTOPOV, AM.

AUTHORS: Protopopov, A. M., Lysmont, V. P. 89-10-20/35

TITLE: The Angular Distributions of Light and Heavy Fragments From the 14 MeV Neutron Fission of U^{233} (Ob uglovom raspredelenii legkikh i tyazhelykh oskolkov pri delenii U^{233} neytronami s energiyey 14 MeV).

PERIODICAL: Atomnaya Energiya, 1958, Vol 4, Nr 2, pp. 194-195 (USSR).

ABSTRACT: With none of the hitherto known nuclear models the following question can be answered: Do light and heavy fission fragments have the same angular distribution or is there a certain anisotropy? The authors try with new measurements to add to the experimental data hitherto known. The distribution of light and heavy fission fragments in the direction parallel to the direction of entering neutrons is measured and shows the following results:

Serie.	Number of registered fission pairs.	Number of light fragments ejected at an angle of 0°.	Number of light fragments ejected at an angle of 180°.
1	303	140	163
2	553	284	269

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The Angular Distributions of Light and Heavy Fragments from the 89-1c-2o/35

Sum	856	424 ± 21	432 ± 21

Statistical error

The results show that the angular anisotropy increases with the increasing ratio between fission fragments and mass. The same effect was also observed with the fission of U^{238}, U^{235}, U^{233}, Th^{232} and Th^{230} with 22 MeV protons. There are 1 table, and 4 references.

SUBMITTED. March 28, 1957.

AVAILABLE. Library of Congress.

Card 2/2 1. Fission fragments-Diffusion

AUTHORS: Protopopov, A.N., Blinov, M.V. 89-4-4-11/28

TITLE: The Determination of the Mean Neutron Number Produced by the Fission of U^{235} With 14.8 MeV Neutrons (Opredeleniye srednego chisla neytronov, ispuskayemykh pri delenii U^{235} neytronami s energiyey 14.8 Mev)

PERIODICAL: Atomnaya Energiya, 1958, Vol. 4, Nr 4, pp. 374-376 (USSR)

ABSTRACT: By means of the coincidence between neutrons and the fission fragments the number ν was determined. The resolving time of the coincidence apparatus was $(1.00 \pm 0.05)^{-7}$s. The chamber is an ionization chamber in which the uranium layer is of considerable thickness ($\sim$ 2mg/cm^2), in order to increase detection sensitivity. The reaction $T(d,n)He^4$ with E_d = 175 KeV was used as a neutron source, and during irradiation a neutron flux of $(1-2).10^9$ n/s was maintained.
On the assumption that $\bar{\nu}_T = 2,47 \pm 0,03$ for U^{235} (thermal neutrons), ν was measured for a neutron energy of 14,8 MeV as being $4,7 \pm 0,5$. There are 1 table, and 8 references, 2 of which

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The Determination of the Mean Neutron Number Produced by the Fission of U^{235} With 14.8 MeV Neutrons

89-4-4-11/28

are Soviet.

SUBMITTED: July 8, 1957

1. Uranium--Fission 2. Neutrons--Detection 3. Neutrons --Energy 4. Coincidence counters--Performance

Card 2/2

AUTHORS: Protopopov, A. N., Blinov, M. V. SOV/89-5-1-9/28

TITLE: The Determination of the Average Neutron Yield in the Fission of U^{233} by 14,8 MeV Neutrons (Opredeleniye srednego chisla neytronov, ispuskayemykh pri delenii U^{233} neytronami s energiyey 14,8 MeV)

PERIODICAL: Atomnaya energiya, 1958, Vol. 5, Nr 1, pp. 71-71 (USSR)

ABSTRACT: For measuring the number ν the method described (Ref 1) was employed. 1,74 ± 0,16 was found as the ratio γ / γ^T. If 2,53 ± 0,03 (Ref 2) is used for γ^T, γ = 4,40 ± 0,45 is obtained. There are 2 references, 1 of which is Soviet.

SUBMITTED: January 27, 1958

1. Uranium--Fission 2. Neutron cross section--Measurement

Card 1/1

AUTHORS: ~~Protopopov, A. N.~~, Tolmachev, G. M., Ushatskiy, V. N., Venediktova, R. V., Krisyuk, I. T., Rodionova, L. P., Yakovleva, G. V. SOV/89-5-2-5/36

TITLE: Distribution of the Mass of Fission Fragments Resulting From the Fission of U^{235}, U^{238} and Pu^{239} Induced by 14,6 MeV Neutrons (Raspredeleniye oskolkov po massam pri delenii U^{235}, U^{238}, Pu^{239} neytronami s energiiyey 14,6 Mev)

PERIODICAL: Atomnaya energiya, 1958, Vol. 5, Nr 2, pp. 130-134 (USSR)

ABSTRACT: The reaction $H^3(d,n)He^4$ served as a neutron source, the deuterons being accelerated up to 170 kV. Irradiation of the nuclei to be fissioned took place by means of a medium neutron flux of $5 \cdot 10^8$ n/cm^2.sec. Irradiation lasted from some minutes up to 8 hours. Separation of the fission products was carried out by the method of isotopic dilution. The separated elements were brought into anhydrous or non-hygroscopic compounds the absolute β-activity of which was measured with respect to the saturation activity of Mo^{99}. The following relative yields were measured:

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Distribution of the Mass of Fission Fragments Resulting From the Fission of U^{235}, U^{238} and Pu^{239} Induced by 14,6 MeV Neutrons

SOV/89-5-2-5/36

	U^{235}	U^{238}	Pu^{239}
Sr^{89}	0,86±0,04	0,55±0,03	0,44±0,02
Sr^{91}	0,96±0,07	0,65±0,05	0,49±0,03
Zr^{95}	0,97±0,04	0,93±0,04	-
Zr^{97}	1,16±0,05	1,02±0,05	0,96±0,04
Mo^{90}	1	1	1
Mo^{101}	-	0,99±0,04	-
Mo^{102}	-	0,71±0,08	-
Ru^{105}	0,28±0,02	0,39±0,03	-
Ag^{111}	0,22±0,01	0,18±0,01	0,34±0,02
Ag^{113}	0,22±0,02	0,16±0,01	-

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Distribution of the Mass of Fission Fragments Resulting From the Fission of U^{235}, U^{238} and Pu^{239} Induced by 14,6 MeV Neutrons

SOV/89-5-2-5/36

	U^{235}	U^{238}	Pu^{239}
Cd^{115}	0,21±0,01	0,16±0,01	0,28±0,02
I^{131}	0,83±0,05	0,91±0,05	-
Ba^{140}	0,86±0,04	0,80±0,04	0,64±0,03

The half-life of Mo^{99} was measured separately: $T_{1/2}$= 67,2±0,2 h. There are 3 figures, 1 table, and 16 references, 3 of which are Soviet.

SUBMITTED: September 12, 1958

Card 3/3

KURASHEV, R.I., PROTOPOPOV, A.N. (Moskva)

Congenital pollex varus. Ortop.travm. i protez. 19 no.4:53 Jl-Ag '58 (MIRA 11:11)
(THUMB—ABNORMITIES AND DEFORMITIES)

SKOTNIKOV, V.I., kand.med.nauk; PROTOPOPOV, A.N.

Clinicoroentgenographic data on prolapse of the gastric mucosa into the duodenum. Terap. arkh. 30 no.3:83-88 Mr '58. (MIRA 11:4)

1. Iz kafedry rentgenologii i meditsinskoy radiologii (zav.-prof. B.A. TSybul'skiy) Ryazanskogo meditsinskogo instituta imeni I.P. Pavlova.

(STOMACH, diseases,
mucosal prolapse into duodenum, clin. aspects & X-ray (Rus)

PROTOPOPOV, A. N.

56-1-48/56

AUTHORS: Protopopov, A. N., Eysmont, V. P.

TITLE: On the Angular Anisotropy of the Flying off of Fragments in the Fission of Pu^{239} by Neutrons With the Energy 14 MeV (Ob uglovoy anizotropii vyleta oskolkov pri delenii Pu^{239} neytronami s energiyey 14 MeV)

PERIODICAL: Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, 1958, Vol. 34, Nr. 1, pp. 250 - 251 (USSR)

ABSTRACT: The degree of anisotropy of the fission of Pu^{239} was determined with an ionization chamber. The target of Pu^{239} (with a density of $\sim$300 microgram/cm^2) was fastened to a collimator. The fission was excited by neutrons with the energy 14,8 MeV. By a simple rotation of the chamber around its axis one goes over from the counting of the fragments under the angle 0^0 to the counting of the fragments under the angle 90^0 (with reference to the neutron beam). The maximum angle between the direction of flying off of the fragments and the fixed direction (0^0 and 90^0) amounted to 25^0. For Pu^{239} the degree of anisotropy 1,14 was found here. For the degree of anisotropy for U^{235} the value 1,25 was found. Corrections for the motion of the center of gravity, the inaccuracy of the angle determination and for the background of the scattered neutrons were made in the

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On the Angular Anisotropy of the Flying off of Fragments in the Fission of Pu^{239} by Neutrons With the Energy 14 MeV

quantities measured here. In this manner the values 1,15 ± 0,05 for Pu^{239} and 1,28 ± 0,07 for U^{235} are found for the final values of the degree of anisotropy. The results found here show that the anisotropy of the nuclei with the same parity is not only determined by the amount of the spin of the target-nucleus. The anisotropy decreases with increasing value of the parameter Z^2/A. Unfortunately the small number and the low accuracy of the experimental data do not permit any exacter determination of the dependence of the degree of anisotropy on the parameters of the nucleus. The quantum effects may manifest themselves as certain deviations from the fundamental tendency for the reduction of the anisotropy on transition to heavier nuclei. There are 1 figure, and 10 references, 4 of which are Slavic.

ASSOCIATION: Radium Institute AN USSR (Radiyeviy institut Akademii nauk SSSR)

SUBMITTED: October 22, 1957

AVAILABLE: Library of Congress

Card 2/2

AUTHORS: Protopopov, A. N., Shiryayev, B. M. 56-2-1o/51

TITLE: The Study of γ-Rays Emitted in the Fission of U^{235} Induced by 2.8 and 14.7 MeV Neutrons (Issledovaniye γ-luchey soprovozhdayushchikh deleniye U^{235} neytronami s energiyey 2,8 i 14,7 MeV)

PERIODICAL: Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, 1958, Vol 34, Nr 2, pp 331-333 (USSR)

ABSTRACT: By means of a coincidence apparatus the authors investigated the spectrum of γ-quanta which coincide with the fission of U^{235} under the action of fast and thermal neutrons. By means of the comparison of experimentally obtained spectra some conclusions on γ-rays can be drawn occuring parallel with the fission of U^{235} under the action of fast neutrons. A diagram shows the block scheme of the apparatus used for the measurements. The γ-quanta were recorded by means of a scintillation counter with a NaJ(Tl)-crystal and with a spectrometric photomultiplier of the ФЭУ-С type. The fission fragments were recorded by means of a multilayer ionization chamber, which was filled with a mixture of

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argon (95%) and carbonic acid gas (5%) under a pressure of 760 torr. The layers of uranium oxide (with 97,8 % U^{235}) were deposited electrolytically on the electrodes of the chamber. The impulses of the chamber were passed on across a linear amplifier to the coincidence circuit. The neutrons with the energy 2,3 and 14,7 MeV were formed in the reactions $D(d,n)He^3$ and $T(d,n)He^4$ at an energy of the bombarded deuterons of 180 keV. The thermal neutrons were obtained by means of slowing down the fast neutrons by means of a lead layer (10 cm) and paraffine (25 cm). The distributions of the impulses on the amplitudes obtained by these measurements are shown in a diagram. The spectra have the same shape within the range of amplitudes investigated. In the fission of U^{235} by thermal neutrons this range of amplitudes covers about 90% of the total amount and 65-70% of the total amount of momentary quanta. The total energy of the γ-quanta emitted in the fission is proportional to the mean number of the γ-quanta corresponding to one of fission process. Within the experimental accuracy (15%) the total energy of the fission of U^{235} by neutrons with 2,8 and 14,7 MeV-

The Study of γ-Rays Emitted in the Fission of U^{235} Induced by 2.8 and 14.7 MeV Neutrons 56-2-10/51

-accompanying γ-quanta is the same as in the fission of U^{235} by thermal neutrons. There are 2 figures and 6 references, 3 of which are Slavic.

ASSOCIATION: Radium Institute AS USSR (Radiyevyy institut Akademii nauk SSSR)

SUBMITTED: August 30, 1957

AVAILABLE: Library of Congress

1. Ionization chambers-Applications 2. γ-Rays-Study and teaching 3. Scintillation counters-Applications

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Protopopov, A.N.

PHASE I BOOK EXPLOITATION SOV/3583

Akademiya nauk SSSR. Radiyevyy institut

Trudy, t. IX (Transactions of the Radium Institute, Academy of Sciences USSR, Vol. 9) Moscow, Izd-vo AN SSSR, 1959. 287 p. Errata slip inserted. 1,700 copies printed.

Ed.: N.A. Perfilov, Doctor of Physical and Mathematical Sciences; Ed. of Publishing House: G.M. Aron; Tech. Ed.: A.V. Smirnova.

PURPOSE: The volume is intended for physicists.

COVERAGE: The book represents volume 9 of the Transactions of the Radium Institute and contains the results of studies conducted at the Institute chiefly from 1955 to 1956. There are a number of articles dealing with the study of nuclear reactions occurring with particles of different energies ranging from several eV up to hundreds of MeV. Others treat different problems of the physics of neutrons. Results of studies of various neutron sources, neutron energy distribution in a moderator (water), and other problems connected with the theory of neutron interaction with matter are presented. The majority of the articles are concerned with problems of method. The authors provide a complete description of the construction of equipment and of the results of tests performed under laboratory conditions. No personalities are mentioned. References accompany individual articles.

Card [illegible]

SOV/120-59-4-13/50

AUTHORS: Protopopov, A. N., Selitskiy, Yu. A., Solov'yev, S.M.

TITLE: Ultraviolet Radiation Converters in a Gas Scintillation Counter

PERIODICAL: Pribory i tekhnika eksperimenta, 1959, Nr 4, pp 66-69 (USSR)

ABSTRACT: The compounds used are: quaterphenyl, tetraphenylbutadiene, sodium salicylate, and POPOP. The fluorescence decay curves of these substances are examined. Results are given for neutron-induced fission in ^{235}U. The counter is filled with xenon; the design is shown in Fig 1, in which the source is at the top, the valve is on the right, and the end-window photomultiplier (type FEU-33) is at the bottom. The pressure used is near atmospheric. The compounds are deposited in various ways on the walls of the counter and (if they are transparent) on the window to the photomultiplier. The optimum thickness is given as 60 mg/cm^2. The table gives the response to α-particles from ^{241}Am without converter, with tetraphenyl-butadiene, with quaterphenyl, with sodium salicylate, with POPOP, and with quaterphenyl again. The first

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Ultraviolet Radiation Converters in a Gas Scintillation Counter

Column gives the relative light output; the second gives amplitude resolution (in %) for 5.5 MeV α-particle. The notes state that the converter was on the inside of the quartz window, and on the outside, respectively. Fig 2 shows the poisoning effects produced by vapours of the converters: a) sodium salicylate, b) quaterphenyl, and c) POPOP. The times are in days. Fig 3 shows the amplitude resolution for the fission fragments produced from ^{235}U by 15 MeV neutrons (the broken line represents the actual energy distribution). The decay time is nearly independent of the converter (about 10^{-8} sec). The converter to be used must be chosen to suit the conditions

Ultraviolet Radiation Converters in a Gas Scintillation Counter

of the experiment. The paper contains 3 figures, 1 table, and 5 references, all English.

ASSOCIATION: Radiyevyy institut AN USSR (Radium Institute of the Academy of Sciences)

SUBMITTED: June 30, 1958.

Card 3/3

PROTOPOPOV, A.N.; SELITSKIY, Yu.A.; SOLOV'YEV, S.M.

Fission cross-section of uranium for fast neutrons. Trudy Radiev. inst.AN SSSR 9:55-60 '59. (MIRA 14:6)
(Uranium)

ARTEM'YEV, Yu.M.; PROTOPOPOV, A.N.; SHIRYAYEV, B.M.

Gamma rays accompanying the thermal-neutron fission of U^{235}. Trudy Radiev.inst.AN SSSR 9:78-83 '59. (MIRA 14:6)
(Uranium) (Gamma rays)

ARTEM'YEV, Yu.M.; BARANOV, I.A.; BJ[illegible], M.V.; KUZNETSOV, M.I.; PROTOPOPOV, A.N.; SELITSKIY, Yu.A.; SOLOV'YEV, S.M.; SHIRYAYEV, B.M.; EYSMONT, V.P.

Low voltage neutron generator. Trudy Radiev.inst.AN SSSR 9:134-140 '59. (MIRA 14:6)

(Neutrons)

21(7)

AUTHORS: Protopopov, A. N., Selitskiy, Yu. A., Solov'yev, S. M. SOV/89-6-1-9/33

TITLE: Cross Section of the Fission of Am^{241} by Neutrons With an Energy of 14.6 MeV (Secheniye deleniya Am^{241} neytronami s energiyey 14.6 Mev)

PERIODICAL: Atomnaya energiya, 1959, Vol 6, Nr 1, pp 67 - 68 (USSR)

ABSTRACT: Americium is precipitated electrolytically on a platinum disk. The target of 15 mm diameter is placed at a distance of 30 mm from the neutron source. The neutrons originate from the reaction $T(d,n)He^4$. A quantity of 12 μg americium was used. The Pu^{239} content of the preparation was less than 0.6%.

The measuring methods used for determining neutron flux and for counting fissions are described by reference 4. The fission fragments were measured in a gas scintillation counter which was filled with xenon. Transformation of the ultraviolet light flashes of the xenon into visible light was brought about by means of quaterphenyl, which was applied

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to the interior of the counter. The light flashes are recorded by a multiplier FEU -33. The pulses originating from the α-particles are conveyed to a rapid-action discriminator which is fitted with crystal diodes of the type Dg-[illegible]. The pulses are broadened, amplified, and fed into a single-channel catalyzer.
The statistical error committed when counting the fission products amounted to 2%.
The fission cross section for Am^{241} for 14.6 MeV neutrons was determined as amounting to σ = 2.35 ±0.15 b.
The target was produced by G. I. Khlebnikov. A not irradiated target was measured by V. G. Nedovesov in a magnetic α-spectrometer. There are 1 figure and 4 references, 1 of which is Soviet.

SUBMITTED: September 22, 1958

SOV/89-6-6-5/27

21(7)

AUTHORS: Protopopov, A. N., Lysmont, V. P.

TITLE: Anisotropy of the Process of the U^{238} Fission by Neutrons of Energies of 14 Mev (Anizotropiya protsessa deleniya U^{238} neytronami s energiyey 14 Mev)

PERIODICAL: Atomnaya energiya, 1959, Vol 6, Nr 6, pp 644 - 647 (USSR)

ABSTRACT: In continuation of a previous paper (Ref 1) the authors of the present article give further results of investigations of the anisotropy, carried out by means of a double ionization chamber. By way of introduction the experimental order is described (see figure 1). The 14.4 Mev neutrons were formed in the reaction $T(d,n)He^4$ - a tritium-zirconium target was irradiated with 180 kev deuterons. The energy distribution was determined with respect to two directions "0°" and "90°" to the neutron beam. The neutron source was always at a distance of 15 cm from the center of the fissioning layer the diameter of which was 2.5 cm. The maximum angle between the direction of the departure of the fragments and the axis of the collimator channel was 9°; in position "0°" the maximum angle was between

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the directions of the neutrons causing a fission and of the recording fragments $\leq 15^{\circ}$, in position "90°" the minimum angle was between these two directions $\geq 75^{\circ}$. The energy of the fission fragments was determined by a comparison of the fragment momenta with the momenta of the α-particles of U^{238}. In each of the two reference directions about 2000 fissions were recorded. The fragments may be divided into 3 groups according to their proportion by weight; the results of the measurements of angular distribution are listed in a table:

mass ratio of the fragments	"0°"	"90°"
1.0 - 1.3	45±3	46±3
1.3 - 1.5	50±3	53±3
1.5 and more	54±3	49±3
1.0 and more (total spectrum)	50±2	49±2

The numbers indicate the ratio between the number of the cases of one flying away of light fragments and the total number of fissions in % with the statistical error i.e. the part of the light fragments did not deviate from 50% within the experimental accuracy and the angular distribution of the light fragments was symmetrical with an

error of ±3% with respect to the vertical direction to the neutron beam. Figure 2 shows the mass distribution of the fragments (0°, 90°) in a diagram. It was found that in the case of a mass ratio of the fragments smaller than 1.7 - 1.8 the angular anisotropy increases with increasing mass asymmetry. The results were compared with those of other authors and discussed with respect to the statistical theory of angular distribution of fission fragments by V. M. Strutinskiy (Ref 8). In conclusion, the authors thank M. I. Kuznetsov for assistance. There are 2 figures, 1 table, and 8 references, 2 of which are Soviet.

SUBMITTED: December 12, 1958

SOV/56-36-3-42/71

21(7)
AUTHORS: Protopopov, A. N., Baranov, I. A., Eysmont, V. P.

TITLE: On the Angular Anisotropy of the Flying Apart of Fragments in the Fission of Am^{241} by 14.7 Mev Neutrons (Ob uglovoy anizotropii razleta oskolkov pri delenii Am^{241} neytronami s energiyey 14.7 MeV)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 3, pp 920-921 (USSR)

ABSTRACT: In order to determine the influence exercised by nuclear structure on the angular anisotropy in a fission process it is necessary to investigate the angular distribution of the fission fragments of the greatest possible number of nuclei. In an earlier paper (Ref 2) the method was already described by means of which the authors determined the relative number of fragments parallel and vertical to the direction of the incident neutrons in Am^{241} fission. In consideration of the effect of center of mass motion, the finite angular resolution, and the background of scattered neutrons, the degree of angular anisotropy was determined as amounting to 1.08 ± 0.06, which is not in contradiction to Bohr's re-

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On the Angular Anisotropy of the Flying Apart of Fragments in the Fission of Am^{241} by 14.7 Mev Neutrons

presentation (Ref 4). Anisotropy has a certain tendency to diminish with Z^2/A of the fissioning nucleus, but, as a comparison of

Np^{237} : 1.16 ± 0.02 (Ref 1)
Pu^{239} : 1.15 ± 0.05 (Ref 2)
Am^{241} : 1.08 ± 0.06

shows, asymmetry in the case of transuranium changes only very slowly. The general effect can be explained within the framework of the statistical theory by V. M. Strutinskiy.
The authors finally thank G. I. Khlebnikov for the deposition of Americium on the platinum foils.
There are 5 references, 4 of which are Soviet.

SUBMITTED: December 6, 1958

SOV/56-36-3-63/71

21(7)
AUTHORS: Protopopov, A. N., Shiryayev, B. M.

TITLE: γ-Rays, Accompanying U^{238} Fission by Neutrons of the Energy 2.8 and 14.7 Mev (γ-luchi, soprovozhdayushchiye deleniye U^{238} neytronami energii 2,8 i 14,7 MeV)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 3, pp 954 - 955 (USSR)

ABSTRACT: Determination of the average total energy of γ-quanta originating from U^{238}-fission by thermal neutrons gives approximately 7.5 Mev (Ref 1) and for the spontaneous fission of Cf^{252} 8.2 Mev was obtained (Ref 2). Experimentally it was found that for the U^{235} fission by thermal neutrons and by 2.8 and 14.7 Mev neutrons the values obtained for the total γ-energy within the limits of ± 15% coincide (Ref 3). The purpose of the present paper ("Letter to the Editor") was to obtain data concerning the division of energy by γ-rays in U^{238}-fission by fast neutrons. The same method and apparatus were used as in the case of reference 3; the γ-spectra of U^{238}-fission by fast neutrons and those of U^{235}-fission by thermal neutrons were compared; γ-counting was carried out by means

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γ-Rays, Accompanying U^{238} Fission by Neutrons of the Energy 2.8 and 14.7 Mev SOV/56-36-3-63/71

of a scintillation counter with NaJ(Tl) crystal connected in coincidence with a single-layer fission chamber. The chamber contained, with conditions otherwise being the same, a U^{235}-target (1.8 mg/cm^2) and also a U^{238}-target (2.2 mg/cm^2). The results obtained by these investigations are shown by a diagram showing the dependence of the ratio coincidence/fissions on the impulse amplitude in v. Measuring values are along a straight line which declines in the direction of growing amplitudes. The ratio of coincidences between γ-quanta and fragments in the case of U^{238}-fission by 2.8 and 14.7 Mev neutrons and the number of coincidences in the case of U^{235}-fission by thermal neutrons is given as amounting to 1.03 ± 0.03 and 1.00 ± 0.02 respectively. The authors again arrive at the conclusion that for U^{238}-fission by 2.8 and 14.7 Mev neutrons the average total energy of γ-quanta agrees up to ± 15% with the values obtained for U^{235}-fission by thermal neutrons. A comparison with the results obtained by other papers shows that 1) similar values are obtained per fission for all investigated nuclei (U^{235}, U^{238}, Cf^{252})

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γ-Rays, Accompanying U^{238} Fission by Neutrons of the Energy 2.8 and 14.7 Mev SOV/56-36-3-63/71

for the average total energy of γ-quanta per fission process and 2) the γ-quanta energy depends only slightly on the excitation energy of the compound nucleus before fission. The authors in conclusion thank Yu. I. Belyanin for supervising the accelerator during the experiments. There are 1 figure and 3 references, 2 of which are Soviet.

ASSOCIATION: Radiyevyy institut Akademii nauk SSSR (Radium Institute of the Academy of Sciences, USSR)

SUBMITTED: December 6, 1958

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21(7)
AUTHORS: Protopopov, A. N., Eysmont, V. P. SOV/56-36-5-47/76

TITLE: On the Dependence of the Degree of Angular Anisotropy in the Fission Process on Nuclear Structure (O zavisimosti stepeni uglovoy anizotropii protsessa deleniya ot struktury yadra)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 5, pp 1573-1574 (USSR)

ABSTRACT: From the recently obtained experimental data on the angular distribution of the fission fragments of various heavy nuclei it may be concluded that a certain connection exists between the degree of anisotropy of the angular distribution $\sigma(0^\circ)/\sigma(90^\circ)$ and the parameter Z^2/A of the fissioned nucleus, for the degree of anisotropy decreases with increasing Z^2/A. The authors of the present "Letter to the Editor" endeavor to explain this connection thermodynamically. They base on the assumption that in the case of a sufficiently high excitation energy of the compound nucleus the ratio of the fission cross sections at 0 and 90° to the direction of the flight of particles differs considerably from one nucleus to another in accordance with

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SOV/56-36-5-47/76

$\sigma(0^\circ)/\sigma(90^\circ) \sim \exp(\Delta E/T)$, where ΔE denotes the difference of the fission activation energies parallel and perpendicular to the beam, and T is the temperature of the nucleus in the critical state of deformation. For the heavy nuclei investigated ΔE does not depend on the structure of the target nucleus and also not on the properties and the energy of the inciding particle. Nuclear temperature before fission depends in a high degree on the properties of the nucleus (i.e. on Z^2/A) and also on the excitation energy E of the nucleus: $T = 2(E/a)^{1/2}$, $a=3.4.(A-40)^{1/2}$ Mev^{-1}. The excitation energy consists of the kinetic energy E_{kin} of the particles and their binding Energy E_b, the energy of neutron evaporation E_{evap} and the energy of the critical deformation E_{def}: $E = E_{kin}+E_b+E_{evap}+E_{def}$. By evaluation of the individual values the authors determined nuclear temperature in the state of critical deformation for the following nuclei: Th^{232}, U^{238}, U^{235},

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On the Dependence of the Degree of Angular Anisotropy in the Fission Process on Nuclear Structure

SOV/56-36-5-47/76

U^{233}, Np^{237}, Pu^{239} and Am^{241} for the case of fission by 14.3 - 14.8 Mev neutrons. By using the data obtained by a number of other authors they obtained for the dependence of the $\ln[\sigma(0^\circ)/\sigma(90^\circ)]$ of $1/T$ a straight line (see figure), round which the experimental values vary within the limits of error. The ratio $\sigma(0^\circ)/\sigma(90^\circ)$ is actually found to differ considerably from one nucleus to another, viz. like $\exp(\Delta E/T)$ at ΔE = const and $T = f(Z^2/A)$. There are 1 figure and 6 references, 3 of which are Soviet.

SUBMITTED: December 29, 1958

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21(7) SOV/56-36-5-71/76

AUTHORS: Protopopov, A. N., Baranov, I. A., Eysmont, V. P.

TITLE: The Angular Anisotropy and the Energy Characteristics of the Fission Process (Uglovaya anizotropiya i energeticheskiye kharakteristiki protsessa deleniya)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 5, pp 1608-1609 (USSR)

ABSTRACT: The fact that in the case of experimental and theoretical investigations of angular anisotropy the problems of energy distribution over the fragments have hitherto not been directly touched, gave rise to experimental investigations carried out by the authors in this direction which are briefly described by the present "Letter to the Editor". In the introduction the problem is discussed and several known dependences are given, as, e. g., that anisotropy is all the greater, the greater neutron evaporation before a critical deformation occurs. The authors investigated the fission of U^{238} by 14.9 Mev neutrons. By means of a double ionization chamber the energy of the fragments in the

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direction of the neutron beam (0°) and perpendicular hereto (90°) was measured. Angular distribution was the same whenever the direction of the departure of the fragments deviated by not more than 26° from the directions 0 and 90° respectively. The basic conditions and methods of the investigation were the same as described in reference 3; a total of 5000 fissions was investigated at 0°, and 4000 at 90°. It was found that in the case of a mass ratio of fragments of 1.40 - 1.44, the average kinetic energy of the fragments amounts to 170.7 ± 0.6 Mev (0°) and 169.4 ± 0.8 Mev (90°) respectively. If, therefore, a difference in fragment energy exists, it cannot amount to more than 1.5 %. There are 3 Soviet references.

SUBMITTED: February 27, 1959

24(5)
AUTHORS: Protopopov, A. N., Baranov, I. A., Selitskiy, Yu. A., Eysmont, V. P. SOV/56-36-6-47/66

TITLE: The Influence of Nuclear Shells on the Distribution of the Kinetic Energy of Fragments in Fission by Fast Neutrons (Vliyaniye yadernykh obolochek na raspredeleniye kineticheskoy energii oskolkov pri delenii na bystrykh neytronakh)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 6, pp 1932-1933 (USSR)

ABSTRACT: The authors of the present "Letter to the Editor" report on experimental investigations of the distribution of the entire kinetic energy of the fragments in a fission of U^{238} by 14.9 Mev neutrons. The results obtained are compared with those obtained for a U^{235}-fission by 14.1 Mev neutrons and those obtained from the spontaneous disintegration of Cf^{252}. Measurements were carried out by means of a double ionization chamber. From the experimental half width of kinetic energy the charge distribution, the neutron recoil effect, the fluctuations of the number of evaporated neutrons, the instrumental resolving power, and the mass ratio were determined.

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The thus found dependence of the average kinetic energy E and the half width of its distribution ΔE on the mass ratio A_1/A_2 of the fragments are shown by figure 1 (compared with the curves obtained for U^{235}-fission). The curves take an analogous course, and in all cases the curve $E(A_1/A_2)$ and the curve $\Delta E(A_1/A_2)$ have a maximum at a mass ratio of 1.25 + 1.3. Figure 2 shows the distribution of the kinetic energy of the fragments in U^{235}-fission by thermal neutrons and of the spontaneous disintegration of Cf^{252} obtained by measuring the time of flight. It was found that the kinetic energy attains its highest value when the heavy fragment has a mass number near 132. This nucleus probably consists of closed shells of 50 protons and 82 neutrons. It may thus be assumed that the degree of closure of the nuclear shells influences the size of the fragments. There are 2 figures and 6 references.

SUBMITTED: February 21, 1959

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21097
S/186/60/002/006/023/026
A051/A129

21,4200

AUTHORS: Krisyuk, I. T., Platunova, N. B., Protopopov, A. N.

TITLE: Determination of individual yields of certain separation fragments of U^{235} using 14-Mev-energy neutrons

PERICDICAL: Radiokhimiya, v.2, no. 6, 1960, 746 - 748

TEXT: The authors have determined some individual yields of 3 isotopes (Ag^{112}, Cs^{136} and Nb^{97}) and the upper limit was evaluated for the individual Nb^{96} yield. All the individual yields were determined by the radiochemical method of fragment yield from irradiated uranium adding the corresponding carriers. Uranium was irradiated in the form of U_3O_8 using quantities of 2 - 4 g. The yields were determined in the following manner for Cs^{136}: U_3O_8 was irradiated for 6 - 10 hours and converted to a nitrate, a cesium carrier was added (about 30 mg) and $Cs_3Bi_2I_9$ was precipitated from the acetate solution. Finally pure Cs was produced in the form of $CsClO_4$. The active thin layer of Cs was used for determining the effectiveness of the counters by the method described by the authors (Ref. 2: A. N. Protopopov, I. T. Krisyuk, L. P. Podionova, G. V. Yakovleva, Atomnaya energiya,

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Determination of individual yields of certain ....

5, 2, 130, 1958). The determination of the individual yield of Cs^{136} was carried out with respect to Mo^{99} produced from the same uranium sample. For Ag^{112}: the irradiation of uranium lasted 1 hour, it was then diluted in HNO_3 and after adding a carrier (about 4 mg) AgCl precipitated out. The final form of Ag^{112} was AgCl. In order to determine its individual yield, a curve was plotted of the decay of the sample with a thickness of less than 0.3 mg/cm^2 on a proportional 4π-counter, over a period of several days. The curve was then graphically divided into three components, corresponding to the three isotopes of silver; Ag^{111}, Ag^{112}, Ag^{113}. If the number of active atoms proportional to the general yield of the chain A = 112 and to the Ag^{112} yield is known and if the time of irradiation and time of Ag^{112} accumulation from Pd^{112} are considered, then the individual yield of Ag^{112} can be calculated. For Nb^{97}: uranium was irradiated for 10 min, then diluted in HNO_3 containing the Zr and Nb carriers. Niobium was finally obtained after purification in the form of Nb_2O_5 and was calcinated at 1,000°C. The individual yield of niobium was determined by comparing the activities of two niobium samples equal in shape and thickness measured under the same conditions. The Nb^{96} yield was obtained from the residual activity of the niobium samples (after the complete decay of Nb^{97}). The following values were obtained for the

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Determination of individual yields of certain ....

individual yields: Ag^{112}.....(5.1 ± 0.6) %, Cs^{136}.....(4.0 ± 0.5) %, Nb^{97}.....(6.9 ± 1.5) %, Nb^{96}..... 1.0 %. The obtained data within the given margins of error fall on the Wahl curve (Ref. 1: A. C. Wahl, Phys. Rev., 99, 3, 730, 1955). The most probable charge for the given mass Z was determined according to Pappas method (Ref. 4: A. C. Pappas. Internationa Conference on the Peaceful Uses of Atomic Energy, Geneva, 7, 19, U. N., N. Y., 1956). For Nb^{97} Z_p could not be determined according to the above method. Thus, on the graph in addition to experimental errors of the individual yield of Nb^{97} the error of Z_p determination associated with the Pappas method is also added. Obtained data confirm Wahl's conclusions with respect to position and shape of the distribution curve of the charge in the separation of U^{235} by 14 Mev energy neutrons. Using this curve one can introduce corrections for incomplete yields of the chain, when studying the separation of the fragments through the masses. There is 1 figure and 4 references: 2 Soviet-bloc and 2 non-Soviet-bloc. The references to the English language publications read as follows: A. C. Wahl, Phys. Rev., 99, 3, 730, 1955, A. C. Pappas. International Conference on the Peaceful Uses of Atomic Energy. Geneva 7, 19, U. N., N. Y., 1956.

SUBMITTED: February 24, 1960.

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PROTOPOPOV, A.N.

Invagination of small intestine through a gastrointestinal anastomosis into the stomach; clinical rotentgenological pitucture of a small degree of invagination. Vest. rent. i rad. 35 no. 5:79-81 S-O '60. (MIRA 13:12)

1. Iz kafedry rentgenologii i radiologii (zav. - prof. V.N. Shtern) Saratovskogo meditsinskogo instituta (dir. - dotsent B.A. Nikitin) i iz Saratovskoy bol'nitsy Privolzhskoy zheleznoy dorogi (nach. V.G. Arkhangel'skiy).
(INTESTINES--INTUSSUSCEPTION)

Protopopov, A.N

82013
S/056/60/038/02/11/061
B006/B011

24.6600

AUTHORS: Protopopov, A. N., Kuznetsov, M. I., Dermendzhiyev, E. G.

TITLE: Th^{232} Fission Induced by 14.9-Mev Neutrons

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 38, No. 2, pp. 384 - 386

TEXT: In continuation of previous papers, the authors report here on the energy characteristics of Th^{232} fissions induced by 14.9-Mev neutrons. The energy of the fragments was measured in a double ionization chamber with grids and with simultaneous recording of the amplitudes of the pulses produced by fragment pairs. The collimation angle of fragments amounted to 45°. To diminish the influence of fission anisotropy and of the motion of the fragment center of mass upon the results of measurement, the neutron beam was directed onto the target surface under an angle of 3-5°. The neutrons used for irradiation originated from T(d,n)α reactions. The 70 μg/cm^2 thorium target was obtained by sputtering from alcoholic thorium nitrate solution in the electric

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Th^{232} Fission Induced by 14.9-Mev Neutrons

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field on a 25-30 $\mu g/cm^2$ thick film. The further treatment was based on a method by Yu. A. Selitskiy. Purity was checked by the α-spectrum. A total of 12,500 fission events was recorded. The fragment energies were corrected for ionization defects and losses in target backing and collimator. Results are illustrated in Fig. 1. The fission probability as a function of the ratio between heavy and light fragments is shown in Fig. 2. The most probable mass ratio was at 1.43 ± 0.05, wherefrom the most probable masses of heavy and light fragments were found to be 140 ± 3 and 92 ± 3. The distribution of the entire kinetic energy of fission fragments is illustrated in Fig. 3. The half width of this energy distribution is equal to 14.6%, and the most probable kinetic energy is (157 ± 4)Mev. Fig. 4 shows the dependence of the most probable kinetic total energy of the fragments on their mass ratio. The curve distinctly shows two peaks at the mass ratios 1.32 and 1.8. Fig. 5 illustrates the dependence of the spread of energy distribution on the mass ratio. The spread maximum is found at a ratio of 1.17, a second weak increase is observable at 1.8. The maximum at 1.17 deviates from the expected one (1.32) and is probably to be explained by a spread due to the ap-

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Th^{232} Fission Induced by 14.9-Mev Neutrons S/056/60/038/02/11/061
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B006/B011

paratus. The authors finally thank Yu. A. Selitskiy for having prepared the target. There are 5 figures and 8 references: 3 Soviet and 5 American.

ASSOCIATION: Radiyevyy institut Akademii nauk SSSR (Radium Institute of the Academy of Sciences, USSR)

SUBMITTED: August 10, 1959

Card 3/3

PROTOPOPOV, A.N., kand.med.nauk

A quarter of a century since the founding of the Department of Radiology at the Saratov Medical Institute. Vest. rent. i rad. 36 no. 2:75-76 Mr-Ap '61. (MIRA 14:4)
(SARATOV—RADIOLOGY, MEDICAL)

BARANOV, I.A.; PROTOPOPOV, A.N.; EYSMONT, V.P.

Anisotropy of U^{238} fission by 3 Mev. neutrons. Zhur.eksp.i teor. fiz. 41 no.4:1003-1006 O '61. (MIRA 14:10)

1. Radiyevyy institut AN SSSR.
(Uranium—Isotopes) (Nuclear fission) (Neutrons)

S/824/62/000/000/001/004
B183/B102

AUTHOR: Protopopov, A. N.

TITLE: Fission asymmetry

SOURCE: [illegible] atomnykh yader. Ed. by [illegible] Perfilov and V. P. Dzhelepov. Moscow, Gosatomizdat, 1962, 24 - 47

TEXT: This is a review on the fundamental features of symmetric and unsymmetric fission, based on the results mainly in western publications during the last 8 years. The work falls into four sections: (1) fundamental characteristics of the mass distributions of fragments in unsymmetric fission; (2) the fine structure and some other shell effects in unsymmetric fission; (3) the effect of the quantum characteristics of a fissile nucleus on the asymmetry of fission; (4) symmetric fission. Conclusions drawn from the experimental data on the mass distributions in the fission of elements from gold to fermium: unsymmetric and symmetric fission are independent and essentially different processes. The former is a "slow" process in which the fragments not yet separated acquire a shell structure. The latter is a "fast" process in which a highly excited

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Fission asymmetry

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B183/B102

Compound nucleus undergoes fission without any previous neutron emission. This process depends considerably on Z but is almost independent of A. Unsymmetric fission is dominant for trans-thorium elements at excitation energies of from 0 to 40 Mev. At 40 Mev, both types of fission occur with the same probability. The shell structure has a considerable effect on the unsymmetric fission, particularly in the region of 50p + 82n, up to excitation energies of ~20 Mev and possibly also higher. The shell structure of the fragments not yet separated considerable influences the double-peak mass distributions, particularly in the regions of A from 133 to 135 and from 83 to 86. There are 16 figures, 4 tables, and 40 references.

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33236
S/089/62/012/002/008/013
B102/B138

24.6600

AUTHORS: Baranov, I. A., Protopopov, A. N., Eysmont, V. P.

TITLE: Comparison of the kinetic energies of the fragments from 3- and 15 Mev neutron-induced U^{238} fission

PERIODICAL: Atomnaya energiya, v. 12, no. 2, 1962, 150 - 151

TEXT: The total kinetic energies and their dispersion were determined in dependence on fragment mass ratios between 1 and 2 for 3-Mev and 15 Mev neutron-induced U^{238} fission, the neutrons coming from $D(d, n)He^3$ and $T(d, n)He^4$ reactions, respectively. A 450 $\mu g/cm^2$ thick U^{238} target was used, the fragment energies were measured with a double ionization chamber via pulse height coincidences. For 3-Mev neutron induced fissions 8000 events were observed, for 15 Mev, 20,000. Total kinetic energy of a fragment pair was plotted against the energy ratio for both 3 and 15-Mev neutron-induced fissions. Two almost parallel curves were obtained, the former being about 2 Mev higher than the latter. They had a maximum at about 1.25 mass ratio, at higher ratios total kinetic energy fell almost

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Comparison of the kinetic ...

linearly. This result does not agree with calorimetric measurements which indicate an increase in kinetic energy with increasing nuclear excitation. For dispersion a similar curve was obtained with a maximum at a ratio of 1.1. Nuclear excitation was thus found to have no effect on the shape of the fragment energy distribution. Yu. I. Belyanin is thanked for seeing to the accelerator. There are 2 figures and 9 references: 3 Soviet and 6 non-Soviet. The four most recent references to English-language publications read as follows: S. Friedland. Phys. Rev. 84, 75, 1951; J. Wahl. Phys. Rev., 95, 126, 1954; S. Gunn, H. Hichs. Phys. Rev., 107, 1642, 1957; P. Stevenson et al. Phys. Rev. 117, 186, 1960.

SUBMITTED: July 28, 1961

Card 2/2

37103
S/056/62/042/004/015/037
B152/B102

21.1000
AUTHORS: Blinov M. V., Kazarinov N. M., Protopopov A. N.

TITLE: Study of the energy and angular distributions of neutrons emitted in thermal-neutron induced U^{235} fission

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 4, 1962, 1017-1021

TEXT: The authors measured the energy distribution of prompt neutrons emitted by thermal neutrons in U^{235} fission for the angles 0^{o}, 45^{o}, and 90^{o} to the flight direction of fission fragments. The fragments were recorded by a xenon-filled ($p = 1.5$ atm) scintillation counter. An aluminum foil with a thin U^{235} layer (~ 2 mg/cm^2) was attached to this counter. The most probable angle of departure of the fragments was determined by collimators on these layers. Stilbene scintillation detectors for detecting the fission neutrons were placed at a certain distance from the uranium layer at various angles to the flight direction of the fragments. The neutron energy was calculated from the time of flight between the two counters. The time of flight was determined by a

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100-channel time analyzer. The coincidences were taken with ФЭУ-33 (FEU-33) photomultipliers. The half width of the coincidence distribution was $6 \cdot 10^{-10}$ sec for Co^{60} gamma quanta for two pairs of these multipliers. The neutron energy threshold still recorded was about 100 kev. The most important part of this time scale was calibrated on the basis of the flight time of gamma quanta for different paths. The remaining part of the scale was gauged with calibrated pieces of the РК-2 (RK-2) cable. The time resolution in the experiments was $5 \cdot 10^{-9}$ sec. The measurements gave the following ratios as relative neutron emission probability: $N(0^\circ):N(45^\circ):N(90^\circ) = (5.7 + 0.2):(2.9 + 0.1):1$. The energies found in this study are harder for 45° and 90°, and much harder for 0° than those found by V. N. Nefedov (ZhETF, 38, 1657, 1960). The values of the present paper do not agree with the calculations of Yu. A. Vasil'yev et al. (Atomn. energ. 9, 449, 1960). The same was also observed by Vasil'yev for the 14-Mev neutron induced fission of uranium (Yu. A. Vasil'yev et al., ZhETF, 38, 671, 1960). The studies were made with the reactor of the Physicotechnical Institute of the Academy of Sciences USSR. S. M. Solov'yev is thanked for special measurements, A. D. Kolchin, L. I. Radayev, V. V. Pikunov and A. G. Roshchin for technical aid. There are 3 figures.

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Study of the energy and angular ... S/056/62/042/004/015/037
B152/B102

ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR (Physicotechnical Institute of the AS USSR)

SUBMITTED: November 28, 1961

Card 3/3

X

KROPACHEV, Aleksandr Mikhaylovich. Prinimal uchastiye [illegible] A.N., kand. med. nauk; LUF'YE, N.F., red.

[Chronic pneumonias in children] Khronicheskie pnevmonii u detei. Leningrad, Meditsina, 1965. 222 p. (MIRA 18:10)

1. Kafedra rentgenologii Saratovskogo meditsinskogo instituta (for Protopopov).

PROTOPOPOV, A.N., kand. med. nauk (Saratov, ul. Lenina, dom 120, kv.2); MOGELYANSKAYA, K.P.

Clearing phenomenon in the intervertebral disks in osteochondrodystrophy. Ortop., travm. i protez. 26 no. 10:63-65 O '65. (MIRA 18:12)

1. Iz kavedry rentgenologii i radiologii (zav. - prof. V.N. Shtern) Saratovskogo meditsinskogo instituta (rektor - dotsent N.R. Ivanov). Submitted Dec. 8, 1964.

KROPACHEV, A.M., prof.; PROTOPOPOV, A.N., dotsent; MILOVANOVA, A.Ye.

Chronic diffuse interstitial pulmonary fibrosis in children. Vest. rent. i rad. 40 no.6:34-37 N-D '65.

(MIRA 19:1)

1. Kafedra propedevtiki detskikh bolezney (nauchnyy rukovoditel' - prof. A.M. Kropachev) i kafedra rentgenologii i radiologii (zav. - prof. V.N. Shtern) Saratovskogo meditsinskogo instituta.

PROTOPOPOV, A.N., kand. med. nauk; POPOV, Yu.A.

Bilateral single-stage bronchography in children. Vest. rent. i rad. 40 no.2:44-47 Mr-Ap '65. (MIRA 18:6)

1. Kafedra rentgenologii i radiologii (zav.- prof. V.N. Shtern) Saratovskogo meditsinskogo instituta.

L 42113-65 EWA(h)/EWT(m) Peb DM
ACCESSION NR: AP5005799 S/0089/65/018/002/0108/0113

AUTHOR: Blinov, M. V.; Kazarinov, N. M.; Protopopov, A. N. 32 23 B 19

TITLE: Angular and energy characteristics of the emission of fission neutrons from U^{235}

SOURCE: Atomnaya energiya, v. 18, no. 2, 1965, 108-113.

TOPIC TAGS: uranium 235, uranium fission, fission fragment, fission neutron, thermal neutron, angular distribution, emission spectrum

ABSTRACT: In order to obtain additional data on the mechanism of fission-neutron emission, the authors used the time-of-flight method to measure simultaneously the velocities of the fragments and of the neutrons produced by thermal-neutron fission of U^{235} and moving in the same direction. The measurement yielded the emission spectra of the neutrons (the spectrum in the center-of-mass system), which were found to be the same for the heavy and light fragments. The apparatus was built around a time-of-flight spectrometer described elsewhere (Pribory i tekhnika eksperimenta, no. 1, 40, 1964). Detailed measurements were also made of the angular and energy distributions of the neutrons, both independently of the type of frag-

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ACCESSION NR: AP5005799

met, and also separately for the light and heavy fragments. The equipment used to determine the angular and energy spectra was also described before (ZhETF v. 42, 1017, 1962). The obtained distributions were compared with calculations based on the obtained emission spectrum. A comparison has shown that the data are in good agreement, except for small deviations in the angular distribution. It follows from an analysis of the results that the emission spectrum agrees with the calculations based on the statistical evaporation theory, and also that not less than 90% of the U^{235} fission neutrons are emitted during the course of isotropic evaporation of the neutrons from the fully accelerated fragments. "The authors thank Professor D. M. Kaminker for collaboration in setting up the experiment on the reactor of the Fiziko-tekhnicheskiy institut (Physicotechnical Institute) AN SSSR, and K. A. Konoplev, D. A. Yashin, and the entire reactor crew for interest during its performance. The authors are also grateful to S. M. Solov'yev for preparing the uranium targets and to V. A. Bogutskiy, V. A. Kanin, E. M. Karatayev, and V. V. Pikunov for help with the measurements and data reduction." Orig. art. has: 6 figures and 3 formulas.

ASSOCIATION: None

Card 2/3 SUBMITTED: 13JAN64

ACCESSION NR: AP4025950 S/0056/64/046/003/1139/1141

AUTHORS: Blinov, M. V.; Kazarinov, N. M.; Protopopov, A. N.

TITLE: Angular and energy characteristics of emission of U-235 fission neutrons

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 46, no. 3, 1964, 1139-1141

TOPIC TAGS: uranium 235, uranium fission, fission neutron, emission spectrum, energy distribution, angular distribution, cascade evaporation theory

ABSTRACT: In contrast to earlier work by the authors (ZhETF v. 42, 1017, 1962) and by V. N. Nefedov (ZhETF v. 38, 1657, 1960), the present study is devoted to an experimental determination of the c.m.s. energy spectrum of the neutrons from thermal neutron fission of U^{235}. This emission spectrum is then used to calculate the energy and angu-

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lar distributions in the laboratory system. The results of these calculations are compared with experimental distributions, which are measured in more detail than before. Certain discrepancies between the experimental and calculated data are discussed, but in spite of the discrepancies it is concluded that the overwhelming majority of the neutrons (~90%) emitted following thermal-neutron fission of U^{235} are emitted in an ordinary cascade evaporation process from fully accelerated fragment nuclei. The conclusions are drawn from the fact that the experimental neutron-emission spectrum agrees with calculations based on the neutron cascade evaporation theory (K. J. LeCouteur and D. W. Lang, Nuclear Physics, v. 13, 32, 1959). A detailed report will be published in "Atomnaya energiya." Orig. art. has: 1 figure.

ASSOCIATION: None

SUBMITTED: 13Aug63 DATE ACQ: 16Apr64 ENCL: 00

SUB CODE: PH, NS NR REF SOV: 002 OTHER: 001

Card 2/2

[illegible], V. M.; BARANOV, I. A.; PROTOPOPOV, A. N.; PETROV, G. A.

"Some Special Features of the Recording of Alpha Particles and Fission Fragments by Surface-Barrier Silicon Counters."

report submitted for All-Union Conf on Nuclear Spectroscopy, Tbilisi, 14-22 Feb 64.

Radiyevyy Institut (Radium Inst)

BLINOV, M.V.; KAZARINOV, N.M.; PROTOPOPOV, A.N.; SHIRYAYEV, B.M.

Angular anisotropy of γ-quanta occompanying U^{235} fission.
Zhur. eksp. i teor. fiz. 43 no.5:1644-1648 N '62.
(MIRA 15:12)

(Uranium--Isotopes) (Nuclear fission)
(Gamma rays)

KRASOVSKIY, V.V.; PROTOPOPOV, A.N.

Complications of staphylococcal pneumonias in children.
Pediatriia 41 no.9:7-11 S '62. (MIRA 15:12)

1. Iz detskoy khirurgicheskoy kliniki (dir. - prof. N.V. Zakharov) i kafedry rentgenologii i radiologii (zav. - prof. V.N.Shtern) Saratovskogo meditsinskogo instituta.
(STAPHYLOCOCCAL DISEASE) (PNEUMONIA)

BLINOV, M.V.; KAZARINOV, N.M.; PROTOPOPOV, A.N.

Study of the energy and angular distributions of neutrons emitted in the fission of U^{235} induced by thermal neutrons. Zhur.eksp.i teor.fiz. 42 no.4:1017-1021 Ap '62. (MIRA 15:11)
(Neutrons) (Nuclear fission) (Uranium)

4336

S/056/62/043/005/012/058
B102/B104

24.6410

AUTHORS: Blinov, M. V., Kazarinov, N. M., Protopopov, A. N., Shiryayev, B. M.

TITLE: The angular anisotropy of γ-quanta accompanying the U^{235} fission

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 5(11), 1962, 1644-1648

TEXT: The angular anisotropy of γ-quanta emitted in thermal-neutron induced fission of U^{235} was measured under optimum geometry. The γ-quantum detector, a stilbene crystal and an ФЭУ-33 (FEU-33) photomultiplier, was lead-shielded (10 cm) in order to reduce the background effect. The effects of prompt neutrons were eliminated by a multichannel time analyzer (resolution $3\text{-}5 \cdot 10^{-9}$ sec). In previous measurements made with a gas scintillation counter and a copper collimator the anisotropy was found to be 25-30%. Control measurements showed that this high value can be somewhat reduced if account is taken of the γ-quantum

Card 1/3

PROTOPOPOV, A.N. (Saratov)

Spontaneous detachment of gastric polyps. Klin.med. 35 no.4:110-112 Ap '57. (MLRA 10:7)

1. Iz kafedry rentgenologii i radiologii (zav. - dotsent V.N. Shtern) Saratovskogo meditsinskogo instituta (dir. - dotsent V.A. Nikitin) i Saratovskoy bol'nitsy Privolzhskoy zheleznoy dorogi (nach. V.G.Arkhangel'skiy)

(STOMACH NEOPLASMS
polypi, spontaneous detachment, x-ray diag.)
(POLYPI
gastric, spontaneous detachment, x-ray diag.)

PROTSENKO, Aleksandr Nikolayevich; MEL'NIKOVA, A.I., red.

[Conquering the atom] Pokorenie atoma. Moskva, Atom-izdat, 1964. 173 p. (MIRA 17:6)

PROTOPOPOV, A. N.

Hemorrhage in gastric polypi. Terap.arkh. 29 no.4:37-41 Ap '57.
(MIRA 10:10)

1. Iz kafedry rentgenologii i radiologii (zav. - dotsent V.N. Shtern) Saratovskogo meditsinskogo instituta.

(POLYPI, complications,
stomach, hemorr. (Rus))
(STOMACH NEOPLASMS, complications,
polypi, hemorrh. (Rus))

PROTOPOPOV, A.N.

X-ray diagnosis of aberrant pancreas in the gastric wall. Vest. rent. i rad. 32 no.4:77-78 Jl-Ag '57. (MIRA 10:11)

1. Iz kafedry rentgenologii i radiologii (zav. - dotsent V.N. Ahtern) Saratovskogo meditsinskogo instituta (dir. - dotsent B.A. Nikitin) i onkodispansera Saratovskogo gorodskogo otdela zdravookhraneniya (zav. O.P.Kolesnik)

(PANCREAS, abnorm.
aberrant in wall of stomach)
(STOMACH, abnorm.
aberrant pancreas in gastric wall)

PROTOPOPOV, A.N.

Movement of gastric polypi into the duodenum. Vest.rent. i rad. 31 no.2:66-68 Mr-Ap '56. (MLRA 9:8)

1. Iz kafedry rentgenologii (zav. dotsent V.N.Shtern) i kafedry fakul'tetskoy khirurgii pediatricheskogo fakul'teta (zav. prof. N.I.Golubev) Saratovskogo meditsinskogo instituta (dir. dotsent B.A.Nikitin) i onkologicheskogo dispansera Saratovskogo gorodskogo otdela zdravookhraneniya (zav. O.P.Kolesnik)

(STOMACH, neoplasms,
polypi, prolapse into duodenum (Rus))
(POLYPI,
stomach, prolapse into duodenum (Rus))

PROTOPOPOV, A. N., kand. med. nauk

Craniofacial dysostosis (Crouzon's disease). Pediatriia no.11: 70-72 '61. (MIRA 14:12)

1. Iz kafedry rentgenologii i radiologii (zav. - prof. V. N. Shtern) Saratovskogo meditsinskogo instituta (dir. - dotsent I. R. Ivanov)

(DYSOSTOSIS)

PROTOPOPOV, A.N.; CHELNOKOVA, A.A.

Bronchial calculus following rupture of a caseous-fused lymphatic gland in the lumen of the bronchial tree in the adult. Probl. tub. 38 no.3:114-115 '60. (MIRA 14:5)

1. Iz kafedry rentgenologii i radiologii (zav. - prof. V.N.Shtern) Saratovskogo meditsinskogo instituta (dir. - dotsent B.A.Nikitin).
(CALCULI) (LYMPHATICS--TUBERCULOSIS) (BRONCHI)

PROTOPOPOV, Aleksey Nikolayevich A. N., Cand of Med Sci -- (diss) "X-ray determination of stomach polypus." Saratov, 1957, 10 pp (Saratov State Medical Institute) 325 copies (KL, 34-57, 90)

PROTOPOPOV, A.M. (Saratov, ul.Lenina, d.120, kv.2)

Growth rates of gastric polypi. Vop.onk. 4 no.2:170-175 '58. (MIRA 12:8)

1. Iz kafedry rentgenologii i radiologii (zav. - dots.V.N. Shtern) Saratovskogo meditsinskogo instituta (dir. - dots. B.A.Nikitin), Saratovskoy bol'nitsy Privolzhskoy zheleznoy dorogi (nach. - G.Arkhangel'skiy) i Saratovskogo gorodskogo onkologicheskogo dispansera (zav. - O.P.Kolesnik).

(STOMACH NEOPLASMS, pathol.
polypi, growth rates & malignant degen. (Rus))
(POLYPI pathol.
growth rates & malignant degen. of gastric polypi (Rus))

PROTOPOPOV, A. P.

21536 PROTOPOPOV, A. P.

Vserossiyskoye obshchestvo okhrany prirody ko vremeni 100 - letnego yubileya Vsesoyuznogo geograficheskogo obshchestva.
Trudy Vtorogo Vsesoyuz. geogr. s"yezda. T. Sb. M., 1949, s. 463 - 66.

SO: Letopis' Zhurnal'nykh Statey, No. 29, Moskva, 1949.

PROTOPOPOV, A. P., Candidate of Tech Sci (diss) -- "Local heating with infra-red rays in pig-sties". Moscow, 1959. 22 pp (Acad Construction and Architecture USSR, Sci Res Inst of Sanitary Engineering), 150 copies (KL, No 20, 1959, 115)

PROTOPOPOV, A.P.

Coefficients of local resitance of aeration aperatures with filler. Sbor.trud.NIIST no.9:120-124 '61. (MIRA 15:8)
(Barns—Ventilation)

ADAMOVICH, P.V.; BATURIN, V.V.; VAKHVAKHOV, G.G.; VAYNGAUZ, L.G.; VILENSKIY, Ye.Ya.; GAMBURG, P.Yu.; DAVYDOV, Yu.S.; KARPIS, Ye.Ye.; KUZNETSOVA. Z.I.; KOP'YEV, S.F.; LIVCHAK, I.F.; LOBACHEV, P.V.; LEV, G.M.; NOTKIN, Ye.M.; PIRUMOV, A.I.; POLIKARPOV, V.F.; PROTOPOPOV, A.P.; REPIN, N.N.; SLADKOV, S.P.; TALIYEV, V.N.; TROITSKAYA, F.B.; FEDOROV, M.N.; SHEVELEV, F.A.; SHKABEL'NIKOVA, L.P.; SHCHUTSKIY, A.I.; SMIRNOV, L.I., inzh., nauchnyy red.; SMIRNOVA, A.P., red. izd-va; MOCHALINA, Z.S., tekhn. red.; RODINOVA, V.R., tekhn. red.

[Present level and prospects for the development of sanitary engineering and the production of sanitary engineering equipment] Sovremennyi uroven' i perspektivy razvitiia sanitarnoi tekhniki i proizvodstva sanitarno-tekhnicheskogo oborudovaniia. Moskva, Gosstroiizdat, 1962. 283 p. (MIRA 15:8)

1. Akademiya stroitel'stva i arkhitektury SSSR. Institut sanitarnoy tekhniki.

(SANITARY ENGINEERING)

PROTOPOPOV, A.P., dotsent

Infrared radiation. Nauka i pered. op. v sel'khoz. no.10: 6-7 O '56. (MLRA 9:12)

1. Vsesoyuznyy institut mekhanizatsii sel'skogo khozyaystva.
(Infrared rays--Industrial application)
(Swine)

RAKITIN, G.A.; VLASOV, A.F.; GLAGOLEVA, T.A., kandidat tekhnicheskikh nauk; KOROL'KOVA, V.I., kandidat tekhnicheskikh nauk; KUZNETSOV, Ye.I.; KUCHERUK, V.V., kandidat tekhnicheskikh nauk; PROKOPOV, A.P.; KHOTSYANOV, L.F., professor; DUBOVA, A.B., redaktor; KIRSANOVA, N.A., tekhnicheskiy redaktor.

[Labor protection] Okhrana truda. Izd. 2-oe, ispr. Moskva Izd-vo VTsSPS Profizdat, 1956. 278 p. (MLRA 9:5)

1.Moscow. Moskovskaya vysshaya shkola profdvizheniya. 2.Chlen-korrespondent Akademii meditsinskikh nauk (for Khotsyanov).
(INDUSTRIAL HYGIENE) (INDUSTRIAL SAFETY)

PROTOPOPOV, A.S., kandidat tekhnicheskikh nauk.

Power relationships during detection of noise and signal in the same place. Trudy MAI no.65:39-71 '56. (MLRA 9:12)
(Radio--Noise)

PROTOPOPOV, A.S.

Calculation of the output power of a detector with almost real characteristics during simultaneous signal and noise detection. Radiotekh. i elektron. 8 no.12:2024-2033 D '63. (MIRA 16:12)

PROTOPOPOV, A.S.

Correlation couplings of the output voltage of a switched RC integrator. Radiotekh. i elektron. 10 no.6:1073-1082 Je '65.
(MIRA 18:6)

PROTOPOPOV, A.S.

Correlation couplings of the output voltage of a switched RC integrator. Radiotekh. i elektron. 10 no.7:1260-1268 Jl '65. (MIRA 18:7)

PROTOPOPOV, A.S., kandidat tekhnicheskikh nauk.

Calculations for an amplifier circuit loaded on a coordinated line. Trudy MAI no.65:114-125 '56. (MLRA 9:12)
(Amplifiers, Electron-tube)

PROKHOROV, A.S.

Probability distribution of the operation of a switching circuit subject to the action of nonsteady RC noise. Radiotekh. i elektron. 10 no.2:245-259 F '65. (MIRA 18:3)

TSYS', P.N.; KALESNIK, S.V.; SOKOLOV, N.N.; CHOCHIA, N.S.; PROTOPOPOV, A.P.; ZABELIN, I.M.; GVOZDETSKIY, N.A.; YEFREMOV, Yu.K.; KARA-MOSKO, A.S.; KOZLOV, I.V.: SOLNTSEV, N.A.; ISACHENKO, A.G.; ARMAND, D.L.; MIROSHNICHENKO, V.P.; PETROV, K.M.; KAZAKOVA, O.N.; MIKHAYLOV, N.I.; PARMUZIN, Yu.P.; GERENCHUK, K.I.; MIL'KOV, F.N.; TARASOV, F.V.; NIKOLAYEV, V.N.; SOBOLEV, L.N.; RYBIN, N.N.; DUMIN, B.Ya.; IGNAT'YEV, G.M.; MEL'KHEYEV, M.N.; SANEBLIDZE, M.S.; VASIL'YEVA, I.V.; PEREVALOV, V.A.; BASALIKAS, A.B.

Discussion at the conference on studying land forms. Nauk. zap. L'viv. un., 40:231-267 '57. (MIRA 11:6)
1.L'vovskiy gosudarstvennyy universitet (for TSys', Gerenchuk, Dumin). 2.Laboratoriya aerometodov AN SSSR, Leningrad (for Sokolov, Miroshnichenko, Petrov). 3.Institut geografii AN SSSR, Moskva (for Armand, Sobolev). 4.Gosudarstvennyy universitet, Voronezh (for Mil'kov, Tarasov). 5.Leningradskiy gosudarstvennyy universitet (for Chochia, Isachenko, Kazakova). 6.Komissiya okhrany prirody AN SSSR, Moskva (for Protopopov). 7.Gosudarstvennyy universitet, Chernovtsy (for Rybin). 8.Gosudarstvennyy universitet, Irkutsk (for Mel'kheyev). 9.Gosudarstvennyy pedagogicheskiy institut im. V.I. Lenina, Moskva (for Vasil'yeva). 10.Bol'shaya Sovetskaya Entsiklopediya (for Zabelin). 11.Gosudarstvennyy universitet, Tbilisi (for Saneblidze). 12.Moskovskiy gosudarstvennyy universitet (for Gvozdetskiy, Solntsev, Mikhaylov, Parmuzin, Nikolayev, Ignat'yev). 13.Torgovo-ekonomicheskiy institut, L'vov (for Perevalov). 14.Gosudarstvennyy institut im. Kapsukasa, Vil'nyus (for Basalikas). 15.Muzey zemlevedeniya Moskovskogo gosudarstvennogo universiteta (for Yefremov, Kozlov). 16.Srednyaya shkola No.13, Kiyev (for Kara-Mosko). (Physical geography)

L 39384-65 EWA(h)/EWT(1) Peb GG

ACCESSION NR: AP5005341 S/0109/65/010/002/0245/0259

AUTHOR: Protopopov, A. S.

TITLE: Probabilistic distribution of the period of operation of a switching circuit affected by a nonstationary RC-noise

SOURCE: Radiotekhnika i elektronika, v. 10, no. 2, 1965, 245-259

TOPIC TAGS: switching circuit, switching theory

ABSTRACT: The action of a random voltage having an arbitrary probability-distribution law upon RC-timed switching circuits is investigated. A regenerative circuit, such as a blocking oscillator or a multivibrator, may operate in such a way that its capacitor voltage will represent a nonstationary random process; the distribution of the "period" between sawtooth peaks is sought. This general formula for the probability distribution is derived: $w(\theta) = w_{E(t)}[E_0(t)] \frac{e^{\theta}}{(e^{\theta}-1)^2} U,$

Card 1/2